Smart Skies			
2007 Science			
Grade Expectations			
Vermont Science			
Grades 5-6			
Activity/Lesson	State	Standards	
Fly by Math	VT	SCI.5-6.S5-6:1.2	Identifying multiple variables that affect a system and using the variables to generate experimental questions that include cause and effect relationships.
Fly by Math	VT	SCI.5-6.S5-6:4.2	Collecting data and recording accurate and complete data from multiple trials.
Fly by Math	VT	SCI.5-6.S5-6:7.1	Explaining data using correct scientific terminology
Fly by Math	VT	SCI.5-6.S5-6:7.3	Considering all data when developing an explanation/conclusion.
Fly by Math	VT	SCI.5-6.S5-6:19.1	Measuring and calculating speed (the distance an object moves over a measured amount of time).
Fly by Math	VT	SCI.5-6.S5-6:19.a	Speed indicates the rate at which an object is traveling.
Fly by Math	VT	SCI.5-6.S5-6:19.b	Speed is a relationship between the distance an object travels and time elapsed.
Fly by Math	VT	SCI.5-6.S5-6:20.1	Design an investigation to collect evidence about an object's inertia and explaining their observation in terms of the object's tendency to resist a change in motion.
Fly by Math	VT	SCI.5-6.S5-6:20.a	Inertia is the tendency of an object to resist a change in motion and depends upon the object's mass. Stationary objects tend to remain stationary; moving objects tend to continue moving (Newton's First Law).
Fly by Math	VT	SCI.5-6.S5-6:21.1	Investigating variables that change an object's speed, direction, or both, and identifying and describing the forces that cause the change in motion.
Fly by Math	VT	SCI.5-6.S5-6:21.a	A force applied to a moving object will change the object's speed, direction or both.
Fly by Math	VT	SCI.5-6.S5-6:21.b	Friction is a force that often opposes motion.
Fly by Math	VT	SCI.5-6.S5-6:22.a	Gravity is the force that holds objects to the earth's surface, keeps planets in orbit around the sun, and governs the rest of the motion in the solar system.
Fly by Math	VT	SCI.5-6.S5-6:22.b	The force of gravity pulls toward the center of mass of an object.
Line Up with Math	VT	SCI.5-6.S5-6:19.1	Measuring and calculating speed (the distance an object moves over a measured amount of time).
Line Up with Math	VT	SCI.5-6.S5-6:19.a	Speed indicates the rate at which an object is traveling.
Line Up with Math	VT	SCI.5-6.S5-6:19.b	Speed is a relationship between the distance an object travels and time elapsed.

Activity/Lesson	State	Standards	
Line Up with Math	VT	SCI.5-6.S5-6:20.1	Design an investigation to collect evidence about an object's inertia and explaining their observation in terms of the object's tendency to resist a change in motion.
Line Up with Math	VT	SCI.5-6.S5-6:20.a	Inertia is the tendency of an object to resist a change in motion and depends upon the object's mass. Stationary objects tend to remain stationary; moving objects tend to continue moving (Newton's First Law).
Line Up with Math	VT	SCI.5-6.S5-6:21.1	Investigating variables that change an object's speed, direction, or both, and identifying and describing the forces that cause the change in motion.
Line Up with Math	VT	SCI.5-6.S5-6:21.a	A force applied to a moving object will change the object's speed, direction or both.
Line Up with Math	VT	SCI.5-6.S5-6:21.b	Friction is a force that often opposes motion.
Line Up with Math	VT	SCI.5-6.S5-6:25.1	Identifying real world objects that demonstrate and utilize a magnetic force field acting over a distance.
Line Up with Math	VT	SCI.5-6.S5-6:25.a	Magnetism is a force field that acts over a distance.
Line Up with Math	VT	SCI.5-6.S5-6:45.a	From earth, the moon and the sun appear to be the same size because the moon is so much closer to the earth than the sun.
		Smart Skies	
		2007 Science	
		Grade Expectations	
Vermont Science			
Grades 7-8			
Activity/Lesson	**State**	**Standards**	
Fly by Math	VT	SCI.7-8.S7-8:3.1.c	A control for comparing data when appropriate.
Fly by Math	VT	SCI.7-8.S7-8:3.1.d	Identification of tools and procedures for collecting data and reducing error.
Fly by Math	VT	SCI.7-8.S7-8:4.2	Using technology to collect, quantify, organize, and store observations (e.g., use of probe).
Fly by Math	VT	SCI.7-8.S7-8:6.1	Identifying, considering and addressing experimental errors (e.g., errors in experimental design, errors in data collection procedures).
Fly by Math	VT	SCI.7-8.S7-8:7.2	Generating alternative explanations.
Fly by Math	VT	SCI.7-8.S7-8:7.5	Using mathematical analysis as an integral component of the conclusion.
Fly by Math	VT	SCI.7-8.S7-8:8.1	Identifying additional data that would strengthen an investigation.
Fly by Math	VT	SCI.7-8.S7-8:19.2	Describing and explaining how the acceleration of an object is proportional to the force on the object and inversely proportional to the mass of the object.

Fly by Math	VT	SCI.7-8.S7-8:19.a	Velocity indicates the speed and the direction of a moving object.
Fly by Math	VT	SCI.7-8.S7-8:19.b	Momentum is the characteristic of an object in motion that depends on the object's mass and velocity. Momentum provides the ability for a moving object to stay in motion without an additional force.
Fly by Math	VT	SCI.7-8.S7-8:19.c	Acceleration is a relationship between the force applied to a moving object and the mass of the object (Newton's Second Law).
Fly by Math	VT	SCI.7-8.S7-8:21.1	Diagramming or describing, after observing a moving object, the forces acting on the object before and after it is put into motion (Students include in their diagram or description, the effect of these forces on the motion of the object.)
Fly by Math	VT	SCI.7-8.S7-8:21.a	An object that is not subjected to a force will continue to move at a constant speed and in a straight line.
Fly by Math	VT	SCI.7-8.S7-8:21.b	If more than one force acts on an object along a straight line, then the forces will reinforce or cancel one another,depending on their direction and magnitude.
Fly by Math	VT	SCI.7-8.S7-8:21.c	Unbalanced forces will cause changes in speed or direction of an object's motion.
Fly by Math	VT	SCI.7-8.S7-8:22.b	The force of gravity is hard to detect unless at least one of the objects has considerable mass.
Fly by Math	VT	SCI.7-8.S7-8:23.2	Creating a diagram, model, or analogy to explain differences among conduction, convection, and radiation, and using their visual to explain how heat energy travels in different directions and through different materials by each method of energy transfer.
Fly by Math	VT	SCI.7-8.S7-8:23.b	Temperature is a measure of the rate of motion of the molecules in a substance.
Fly by Math	VT	SCI.7-8.S7-8:45.1	Identifying and labeling the location of the sun in our solar system and its relationship to the galaxy.
Line Up with Math	VT	SCI.7-8.S7-8:12.a	Atoms and molecules are in perpetual motion.
Line Up with Math	VT	SCI.7-8.S7-8:14.a	Increased temperature of substances causes increased motion of the atoms and molecules in the substance.
Line Up with Math	VT	SCI.7-8.S7-8:19.a	Velocity indicates the speed and the direction of a moving object.
Line Up with Math	VT	SCI.7-8.S7-8:19.b	Momentum is the characteristic of an object in motion that depends on the object's mass and velocity. Momentum provides the ability for a moving object to stay in motion without an additional force.

Activity/Lesson	State	Standards	
Line Up with Math	VT	SCI.7-8.S7-8:21.1	Diagramming or describing, after observing a moving object, the forces acting on the object before and after it is put into motion (Students include in their diagram or description, the effect of these forces on the motion of the object.)
Line Up with Math	VT	SCI.7-8.S7-8:21.a	An object that is not subjected to a force will continue to move at a constant speed and in a straight line.
Line Up with Math	VT	SCI.7-8.S7-8:21.b	If more than one force acts on an object along a straight line, then the forces will reinforce or cancel one another,depending on their direction and magnitude.
Line Up with Math	VT	SCI.7-8.S7-8:21.c	Unbalanced forces will cause changes in speed or direction of an object's motion.
Line Up with Math	VT	SCI.7-8.S7-8:22.1	Describing and explaining the effects of gravitational force on objects in the Solar System, and identifying evidence that the force of gravity is relative to the mass of objects and their distance apart.
Line Up with Math	VT	SCI.7-8.S7-8:22.a	The force of gravity depends on the amount of mass objects have and how far apart they may be.
Line Up with Math	VT	SCI.7-8.S7-8:23.2	Creating a diagram, model, or analogy to explain differences among conduction, convection, and radiation, and using their visual to explain how heat energy travels in different directions and through different materials by each method of energy transfer.
Line Up with Math	VT	SCI.7-8.S7-8:23.b	Temperature is a measure of the rate of motion of the molecules in a substance.
Line Up with Math	VT	SCI.7-8.S7-8:45.1	Identifying and labeling the location of the sun in our solar system and its relationship to the galaxy.
Smart Skies			
2007 Science			
Grade Expectations			
Vermont Science			
Grades 9-12			
Activity/Lesson	**State**	**Standards**	
Fly by Math	VT	SCI.9-12.S9-12:4.1	Collecting significant data by completing multiple trials;
Fly by Math	VT	SCI.9-12.S9-12:6.2	Analyzing significance of experimental data.
Fly by Math	VT	SCI.9-12.S9-12:19.1	Predicting the path of an object in different reference planes and explaining how and why this occurs.
Fly by Math	VT	SCI.9-12.S9-12:19.3	Modeling, illustrating, and explaining the path of an object which has horizontal and free fall motion (i.e., football, bullet).

Fly by Math	VT	SCI.9-12.S9-12:19.a	Motion is relative. The motion of an object is observed and measured relative to a given frame of reference (point of view) (e.g. trees flashing by when sitting in a moving vehicle).
Fly by Math	VT	SCI.9-12.S9-12:19.b	Acceleration occurs when an object undergoes a change in velocity over time (speed up, slow down, change direction).
Fly by Math	VT	SCI.9-12.S9-12:19.c	Motion is predictable; a falling object increases speed in a predictable pattern as it falls.
Fly by Math	VT	SCI.9-12.S9-12:19.d	Motion is predictable; projectile motion combines a uniform horizontal motion and free-fall motion simultaneously
Fly by Math	VT	SCI.9-12.S9-12:20.1	Explaining how inertia affects the outcome in each of a series of situations (i.e., kicking a sand-filled football, moving a bowl of soup quickly across the table).
Fly by Math	VT	SCI.9-12.S9-12:20.a	An object at rest or moving uniformly (in a straight line) will remain so unless acted upon by an external unbalanced (net) force (Newton's First Law, The Law of Inertia). (e.g., We wear seatbelts because our body has a tendency to keep moving when the vehicle stops.)
Fly by Math	VT	SCI.9-12.S9-12:21.1	Investigating (predict, model, illustrate, explain) whether the acceleration is greater or less as either the mass of the system or the force accelerating the mass is changed and using data to support your conclusion (e.g., cart with variable weights on horizontal table attached to a string with weights).
Fly by Math	VT	SCI.9-12.S9-12:21.3	Investigating quantitatively the acceleration as either the mass of the system or the force accelerating the mass is changed (e.g., cart with variable weights on horizontal table attached to a string with weights.)
Fly by Math	VT	SCI.9-12.S9-12:21.a	Every body continues in its state of rest or in a straight line, unless it is compelled to change that state by forces impressed upon it (Newton's First Law).
Fly by Math	VT	SCI.9-12.S9-12:21.b	If an unbalanced force acts on an object it will accelerate; the acceleration is proportional to the net force and inversely proportional to the mass of the object (Newton's Second Law F=ma). (e.g. A vehicle accelerates more slowly when it's full of passengers.)
Fly by Math	VT	SCI.9-12.S9-12:21.c	Whenever one object exerts a force on a second object, a force equal in magnitude but opposite in direction is exerted on the first object. Forces always arise in pairs (Newton's Third Law). (e.g., When you lean against a wall, the wall pushes back at you.)

Fly by Math	VT	SCI.9-12.S9-12:22.a	The force of gravity is a universal force of attraction between ANY two objects and is proportional to the masses of those two objects and weakens rapidly with the distance between the objects (e.g., More mass produces more force; less distance produces more force, such as bodies in the solar system).
Fly by Math	VT	SCI.9-12.S9-12:27.a	An electromagnetic force is a universal force that acts within and between atoms and is vastly stronger than the gravitational forces between atoms (strength depends upon how much charge is present).
Fly by Math	VT	SCI.9-12.S9-12:28.a	An electromagnetic force is a universal force that acts within and between atoms and is vastly stronger than the gravitational forces between atoms (strength depends upon how much charge is present).
Fly by Math	VT	SCI.9-12.S9-12:30.1	Predicting, explaining and drawing conclusions about the direction of movement of substances across a membrane.
Line Up with Math	VT	SCI.9-12.S9-12:19.1	Predicting the path of an object in different reference planes and explaining how and why this occurs.
Line Up with Math	VT	SCI.9-12.S9-12:19.2	Using modeling and illustrating, to explain how distance and velocity change over time for a free falling object.
Line Up with Math	VT	SCI.9-12.S9-12:19.3	Modeling, illustrating, and explaining the path of an object which has horizontal and free fall motion (i.e., football, bullet).
Line Up with Math	VT	SCI.9-12.S9-12:19.a	Motion is relative. The motion of an object is observed and measured relative to a given frame of reference (point of view) (e.g. trees flashing by when sitting in a moving vehicle).
Line Up with Math	VT	SCI.9-12.S9-12:19.b	Acceleration occurs when an object undergoes a change in velocity over time (speed up, slow down, change direction).
Line Up with Math	VT	SCI.9-12.S9-12:19.c	Motion is predictable; a falling object increases speed in a predictable pattern as it falls.
Line Up with Math	VT	SCI.9-12.S9-12:19.d	Motion is predictable; projectile motion combines a uniform horizontal motion and free-fall motion simultaneously
Line Up with Math	VT	SCI.9-12.S9-12:20.1	Explaining how inertia affects the outcome in each of a series of situations (i.e., kicking a sand-filled football, moving a bowl of soup quickly across the table).
Line Up with Math	VT	SCI.9-12.S9-12:21.c	Whenever one object exerts a force on a second object, a force equal in magnitude but opposite in direction is exerted on the first object. Forces always arise in pairs (Newton's Third Law). (e.g., When you lean against a wall, the wall pushes back at you.)

Line Up with Math	VT	SCI.9-12.S9-12:22.1	Predicting in a variety of situations how gravitational force changes when mass changes or when distance changes.
Line Up with Math	VT	SCI.9-12.S9-12:22.a	The force of gravity is a universal force of attraction between ANY two objects and is proportional to the masses of those two objects and weakens rapidly with the distance between the objects (e.g., More mass produces more force; less distance produces more force, such as bodies in the solar system).